

**SECTION 2.0**

**STATUTORY REVIEW SITES**

## **SECTION 2.1**

### **OPERABLE UNITS 2 & 4 LANDFILL 2 LANDFILL 3**

#### **2.1.1 SCOPE AND NATURE OF FIVE-YEAR REVIEW**

The U.S. Air Force (USAF), in coordination with USEPA, Region I and the MEDEP, conducted this review of the Landfill 2 (LF-2) and Landfill 3 (LF-3) remedy pursuant to CERCLA section 121(c), NCP section 300.400 (f) (4) (ii), and the Office of Solid Waste and Emergency Response (OSWER) Directives 9355.7-02 (May 23, 1991) and 93557-02A (Jun 26, 1994). It is a statutory review. The purpose of the review is to ensure that a remedial action remains protective of public health and the environment. This document has been prepared within the scope of a level I review which is applicable for this site.

#### **2.1.2 SUMMARY OF SITE CONDITIONS**

Operable Unit 2 is the management division for investigation and remedy selection for the soils/source component of LF-2 and LF-3. OU-2 deals directly with the landfill contents and their effect on human health and the environment. OU-4 is the groundwater component of LF-2 and LF-3.

LF-2 is located approximately one mile from the west gate on Nebraska Road and covers approximately 9 acres (see Figure 2.1-1). LF-2 received residential, commercial, and industrial wastes from base activities from 1956 until 1974 at which time it was covered with approximately 12" of clean cover soil. From 1956 to 1968 wastes were typically burned and buried. Settlement resulting from decomposition of organic material in the landfill resulted in two separate intermittently wet areas. Before its use as a landfill, the site was mined for gravel.

LF-2 geology is characterized as glaciofluvial, with associated deposits consisting of ablation till underlain by ice-contact deposits, a discontinuous layer of basal till, and dark gray, weathered, pelitic limestone. Overburden thickness ranges from negligible in the central area of the landfill to about 60 feet at the northwestern portion of the site, outside the area of landfilled wastes. In most cases, landfilled wastes were placed on ice-contact deposits; however, they were also placed directly on the bedrock surface in some areas.

Based on interpretive bedrock contours, it appears that a northwest to southeast trending bedrock trough exists beneath LF-2. The topographic high of the trough is located near the northwestern end of LF-3. The trough plunges northwest in the vicinity of LF-2.

The bedrock trough beneath LF-2 apparently influences groundwater flow in both the shallow bedrock and overburden soils. Groundwater flow at LF-2 is to the north-northwest, subparallel to the trend of the bedrock trough (see Figure 2.1-2). This direction of flow

indicates that water flowing across LF-2 may also have flowed through the northern portion of LF-3. Potentiometric head data for two overburden bedrock well pairs shows weak overall upward gradients in the area of LF-2.

The discontinuous shallow overburden aquifer and the fractured-bedrock aquifer appear to form one groundwater system throughout the LF-2 area, due to the permeable nature of the sand and gravel, and the weathered and fractured nature of the bedrock. The water table is located in the overburden soils over the majority of the LF-2 site. Therefore, it can be concluded that groundwater comes into contact with some of the waste throughout the year.

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, inorganics above background concentrations, total petroleum hydrocarbons (TPHs), and oil and grease were detected in groundwater in and around LF-2. In addition, several miscellaneous parameters which are typical indicators of landfill plume contamination were detected in groundwater samples collected in 1993 and 1994.

Contaminants detected in overburden wells inside the landfill perimeter include fuel-related VOCs and Chlorobenzenes, SVOCs (including bis(2-ethylhexyl)phthalate [BEHP] above the Maximum Contaminant Levels [MCL]), pesticides, and inorganics. Concentrations of contaminants detected in perimeter wells completed in the overburden adjacent to or downgradient from LF-2 were generally lower than concentrations within the limits of the waste. No significant organic contaminants were detected in overburden groundwater in perimeter wells.

Inorganics above background concentrations were detected in all bedrock monitoring wells around LF-2. The SVOC BEHP was detected, and the VOC vinyl chloride was detected above its Maximum Exposure Guideline (MEG), but not in excess of its MCL. Tetrachlorethene (PCE) was detected above its MEG but not its MCL. The only inorganics identified as chemicals of potential concern during low-flow sampling (LFS) were arsenic, barium, iron, and manganese.

LF-3 is located approximately one-half mile from the west gate on Sawyer Road and covers approximately 30 acres (see Figure 2.1-1). LF-3 received residential, commercial, and industrial waste from base activities from 1974 to 1991 at which time it was covered with clean native soils similar to LF-2. Before its use as a landfill, the site was mined for gravel.

LF-3 overburden geology is characterized as a former esker deposit, consisting of ablation till underlain by ice-contact deposits, and highly weathered, pelitic limestone. Thickness of the soils outside the landfilled material ranges from about 5 feet on the northern side to a maximum of 55 feet southeast of the site in the bedrock trough. Wastes appear to have been placed directly on the ice-contact sand and gravel deposits.

Bedrock in the LF-3 area is a gray pelitic limestone. The northwest-to southeast-trending bedrock trough present beneath LF-2 appears to continue beneath LF-3, narrowing and rising to a saddle in the northwestern area of LF-3, then deepening again to the southeast of the

landfill. Bedrock is interpreted to be more fractured within the trough axis than on the trough walls.

The water table was typically encountered above the bedrock surface within the perimeter of LF-3 and the cap. The uppermost portion of LF-3 waste appeared to be seasonally saturated prior to capping. The groundwater system is bounded to the east and west of LF-3 by the bedrock trough, and data indicate that the water table enters bedrock in the axis of the trough south of LF-3. To the north of the divide, groundwater flows northward toward LF-2, whereas south of the divide, groundwater flow is interpreted to be southeast (see Figure 2.1-2). Calculated vertical gradients suggest that downward groundwater movement exists on the flanks of the bedrock trough, and limited upward groundwater movement exists in the central areas of the bedrock trough.

VOCs, SVOC, pesticides, and inorganics above background concentrations were detected in groundwater in and around LF-3. Oil and grease were also detected in groundwater samples collected within the LF-3 boundary during 1993 sampling.

Concentrations of VOCs (including benzene, trichloroethene [TCE], PCE, and vinyl chloride), SVOCs (including polynuclear aromatic hydrocarbons [PAHs]), and inorganics (including lead, nickel, and cadmium) were detected above MEGs and/or MCLs within the LF-3 boundary. The only exceedance for pesticides was heptachlor in a single well. Concentrations of VOCs, SVOCs, and inorganics are generally highest in wells within the southern half of the landfill.

VOCs (i.e., PCE, benzene, and vinyl chloride) were detected above the MEGs and/or MCLs in bedrock wells, generally south, east, and west of LF-3. SVOCs have been detected in several bedrock monitoring wells. The only SVOC concentrations above MCLs or MEGs were for BEHP, which was detected in three monitoring wells. No pesticides or Polychlorinated Biphenyls (PCBs) were detected above MEGs and/or MCLs in wells around LF-3. Inorganics above background concentrations have been detected in bedrock wells in the vicinity of LF-3.

Site investigations on LF-2 and LF-3 were conducted in 1985 to determine if contaminants were present at these sites (Weston, 1988). The Remedial Investigation (RI) process commenced in 1988 and terminated with the Final Remedial Investigation/Focused Feasibility Study (ABB Environmental Services, Inc. [ABB-ES], 1994a) for the source OU-2 and a Final RI (ABB-ES, 1995) for the groundwater OU-4. The Final Proposed Plan (ABB-ES, 1994b) and Final Record of Decision (ROD), (ABB-ES, 1994c) for OU-2 were completed in April and November 1994, respectively. The Proposed Plan (ABB-ES, 1996a) and ROD (ABB-ES, 1996b) for the groundwater OU-4 were finalized in May and September 1996, respectively.

## **2.1.3 SUMMARY OF RESPONSE ACTIONS SELECTED**

### **2.1.3.1 Remedial Action Objectives**

Remedial Action Objectives (RAOs) were developed to serve as a framework for the identification of remedial action alternatives. According to the Federal and State guidance, RAOs should be designed to protect human health and the environment by identifying chemicals of concern (COC), receptor groups of greatest concern, exposure routes associated with the highest risk estimates, and a target risk level of the individual contaminants based on site specific exposure scenarios.

The RAOs for the soils/source (OU2) component of LF-2 and LF-3 were:

Soils/Landfill Contents	Prevent dermal contact with and ingestion of contaminated landfill contents and soils.
Air/Dust	Prevent the migration and inhalation of fugitive dust and soil particles with adhering contaminants.
Landfill Gas	Prevent inhalation and explosion of landfill gases.
Surface Water and Sediment	Prevent ingestion, adsorption, and bioconcentration of contaminants in surface water and sediment.
Leachate	Minimize formation and migration of leachate to groundwater and surface water.

The RAOs for groundwater (OU4) at LF-2 and LF-3 were:

- To prevent human exposure to contaminated groundwater; and
- To protect downgradient groundwater from contamination.

### **2.1.3.2 Response Actions Selected**

A detailed analysis of the remedial alternatives was performed using the nine evaluation criteria required by the NCP to select a site remedy.

#### **OU-2**

The response action selected for the soils/source (OU2) component of LF-2 and LF-3 consisted of a low-permeable cover system which meets Resource Conservation and Recovery Act (RCRA), Subtitle C, and Maine hazardous waste landfill cap requirements, and surface and institutional controls.

Implementation of the selected remedy included the following activities:

- Site preparation, consolidation of LAFB soils for subgrade, and grading to minimize erosion and manage runoff;
- Multilayer cover system installation which will comply with RCRA Subtitle C and Maine hazardous waste requirements including landfill gas assessment and controls, and assessment of adjacent wetlands;
- Gates and warning signs installation;
- Deed restrictions on land in the vicinity of the landfills;
- Post closure monitoring and maintenance (M&M); and
- Five-year reviews.

#### **OU-4**

The response action selected for the groundwater (OU4) component of LF-2 and LF-3 is minimal action. The minimal action remedy includes:

- Institutional controls;
- Downgradient groundwater monitoring;
- Five-year site reviews; and
- A contingency action to protect against human exposure to contaminated groundwater.

#### **2.1.3.3 Standards Assessment**

The capping requirements at LF-2 and LF-3 were established to protect human health and the environment. None of the conditions evaluated in the risk assessments (RA) for these sites have changed. Chemical, location, and action-specific Applicable or Relevant and Appropriate Requirements (ARARs) were complied with during the remedial action.

#### **2.1.4 SUMMARY OF RESPONSE ACTION(S) TAKEN**

##### **2.1.4.1 OU-2**

Remedial actions taken to comply with soils/source control (OU2) ROD and the groundwater(OU 4) ROD include:

- Completion of the cover system for LF-2 in 1996;
- Completion of the cover system for LF-3 in 1999;
- Gates and warning signs;
- Land use restrictions;
- Post-closure M&M; and
- Five-year review.

### **Multilayer Cover Systems and Landfill Gas Management**

The cover systems for LF-2 and LF-3 were designed to meet or exceed applicable Federal and State regulations, and in accordance with accepted engineering design practices.

The final cap at LF-2 was built in accordance with the following design documents:

- *Design Drawings, Phase 2 Revised for Landfill 2, Remediation of Operable Unit 2 (OU2), Final Design*; June 8, 1995 (ABB-ES), Issued for Construction
- *Technical Specifications, Phase 2 Revised for Landfill 2, Remediation of Operable Unit 2 (OU2)*; June 8, 1995 (ABB-ES), Issued for Construction
- *Landfill 2 (LF-2) Final Capping, Remedial Action Work Plan*, Final Draft; September 1995, (Bechtel Environmental Services, Inc. [BEI])
- *Landfill 2 Extension Excavation and Interim Surcharge, Remedial Action Work Plan Addendum No. 1*, Final Draft; October 1995 (BEI)
- *Landfill 2 Modifications to Cap Installation to Accommodate Extension, Remedial Action Work Plan Addendum No 2*, Final, May 1996 (BEI)
- *Landfill 2 Final Capping, Removal Action Work Plan Addendum No. 3*, Final; October 1996, (BEI)

The cover system for LF-2, from bottom to top, consisted of the following components:

- Waste
- Interim native soils cover (compacted subgrade)
- 12-inch select bedding

- Geocomposite #2, (gas vent layer)
- 12-inch barrier soil
- Geosynthetic clay liner
- 60-mil Linear Low Density Polyethylene (LLDPE) liner
- Geocomposite #1 (drainage layer)
- 18-inch select bedding
- 18-inch common borrow
- 6-inch filter soil
- 6-inch vegetative cover soil

Documentation of project completion including record drawings is recorded in the *Final Remedial Action Report, Landfill 2 Cover System*, May 1997, BEI.

The final cap at LF-3 was built in accordance with the following design documents:

- *Construction of Landfill 3, Final Cap, Remedial Action Work Plan, Final, Revision 2*, June 1999, BEI.
- Change requests during construction.

The cover system for LF-3, from bottom to top, consists of the following components:

- Waste
- Interim native soils cover (compacted subgrade)
- 12-inch barrier soil
- Geosynthetic clay liner
- 60-mil LLDPE geomembrane
- 12-inch select bedding
- 12-inch common borrow
- 6-inch vegetative cover soil

(Gas venting was accomplished with gas vent risers extending from the waste to above the surface.)

The final inspection for the cover system for LF-3 occurred in November 1999. Outstanding punchlist items were completed in August 2000.

The Draft Remedial Action Report was submitted to the USEPA and the MEDEP in February 2000.

### **Gates and Warning Signs**

Gates have been installed at all entrances (one at LF-3 and two at LF-2) to prevent vehicle access. Signs are being manufactured and were installed in the spring of 2000.

### **Land/Groundwater Use Restrictions**

The ROD for OU-2 specifies the use of property deed restrictions on the land in the vicinity of the landfills to limit subsurface development, use of the property, and excessive vehicular traffic. Both landfills are located on property transferred to the U.S. Fish and Wildlife Service (USFWS) by Transfer Agreement dated September 8, 1998. There is no deed for this Federal-to-Federal agency transfer. Article 7(d) of this Agreement prohibits activities that will affect the OU-2 remedies. Excessive vehicular traffic will be controlled by entrance gates.

The ROD for OU-4 specifies the requirement for institutional controls to restrict the use of groundwater. A groundwater use restriction was placed in the Transfer Agreement with the USFWS for all of their property.

### **Post-Closure Monitoring and Maintenance**

Post-closure M&M of LF-2 and LF-3 activities are detailed in the *Post-Closure Plan, Operable Units 2 and 4, Final*, February 1997, (ABB-ES/HAZWRAP, 1994). The first full year of M&M activities was 1997.

The *1997 Annual Report, Monitoring and Maintenance of Landfills, Final*, July 1998, BEI, included activities at LF-2 and LF-3. This report noted action level exceedances for iron at an LF-2 compliance boundary well and for vinyl chloride, iron, and manganese at an LF-3 compliance boundary well.. The report recommended reducing the settlement monitoring and mowing to once per year.

The *1998 Annual Report, Monitoring and Maintenance of Landfills Final*, Dec 1999, BEI, included activities at LF-2 and LF-3. This report noted action level exceedances for Bis(2-ethylhexyl) phthalate at an LF-2 compliance boundary well and for vinyl chloride at an LF-3 compliance boundary well. The report also recommended an additional compliance well at

LF-2 and a new compliance well at LF-3. The report recommended reducing the settlement monitoring and mowing to once per year.

The 1999 Annual Report, Monitoring and Maintenance of Landfills, Draft, April 2000, MW, included activities at LF-2 and LF-3. There were no exceedances of action levels at the compliance boundary wells.

M&M activities for both LF-2 and LF-3 are contracted until the next five-year review.

## **Five-Year Reviews**

As required by the OU-2 and OU-4 ROD, this five-year site review is intended to evaluate whether the response action continues to protect human health and the environment, assess site conditions, and propose further actions, if necessary.

### **2.1.5 RESULTS AND RECOMMENDATIONS**

#### **2.1.5.1 Results**

Based on review of the Final 1997 Annual Report, Monitoring and Maintenance of Landfills, dated July 1998 and the Final 1998 Annual Report, Monitoring and Maintenance of Landfills, dated Dec 1999, and the 1999 Annual Report, Maintenance of Landfills dated April 2000, the remedies selected for LF-2 and LF-3 are not protective of human health and the environment. The USAF, the USEPA, and the MEDEP agreed that the groundwater compliance and institutional control boundaries at both landfills need to be adjusted based on groundwater monitoring results (exceedances of the vinyl chloride action level) included in the 1998 Monitoring Report. One additional monitoring well downgradient of LF-2, and one additional monitoring well downgradient of LF-3, were installed in the fall of 1999 in accordance with the recommendation in the 1998 Monitoring Report. Groundwater results from sampling performed in December 1999 were below the action levels at these new wells. The USAF, the USEPA, and the Maine DEP agreed that the new compliance boundary should be located to include these new wells and that the institutional control boundary should be located beyond the compliance boundary. The agreed upon boundaries are included in the Draft Operable Unit (OU) 4 (Landfills 2 and 3 Groundwater) and OU12 (Quarry Groundwater) Explanation of Significant Differences, April 2000.

#### **2.1.5.2 Recommendations**

- Establish new groundwater compliance and institutional control boundaries for OU-4.
- Continue to monitor and maintain the landfills in accordance with the *Post-Closure Plan, Operable Units 2 and 4 (OUs 2 and 4), Final*, February, 1997, (ABB-ES/HAZWRAP, 1997).

- BRAC Cleanup Team (BCT) should evaluate frequency of specific M&M activities in accordance with recommendations in the annual reports.
- An institutional control should be implemented for property owned by the University of Maine north of LF-2. The Air Force is currently finalizing a Deed of Easement and Declaration of Covenant with the University of Maine. The groundwater use restriction will run with the property until remediation is complete and agreed upon between the USAF, the USEPA and the Maine DEP. This "Deed" is expected to be finalized by December 2000.

### **2.1.5.3 Statement of Protectiveness**

The remedy selected for OU 2 is currently protective while the OU 4 remedy is currently not protective; however, once the compliance and institutional control boundaries are adjusted and institutional controls are in place, the remedy will be protective.

### **2.1.5.4 Five-Year Reviews**

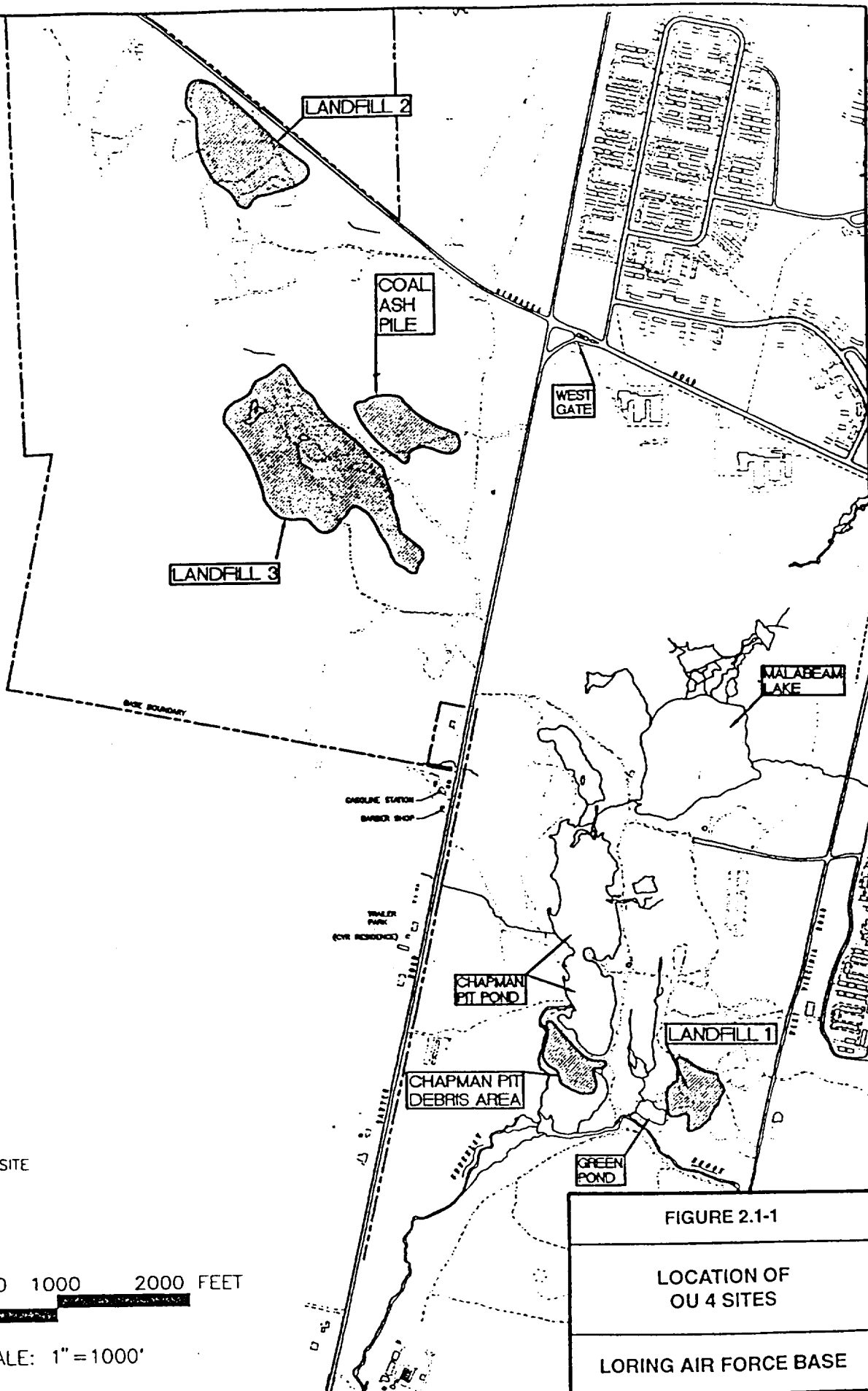
The next five-year reviews for OU2 and OU 4 will be conducted in 2005.

### **2.1.6 REFERENCES**

- ABB-ES and HAZWRAP, 1994. *Draft Final Design Drawings: Loring Air Force Base Closure - Landfills 2 and 3 and Technical Specifications for Remediation of Operable Unit 2 (OU2) and Operable Unit 6 (OU6)*; June.
- ABB-ES, 1994a. *OU 2 Remedial Investigation/Focused Feasibility Study*; Final; Installation Restoration Program; Prepared for HAZWRAP; Portland, Maine; August 1993, Revised April 1994.
- ABB-ES, 1994b. *Landfills 2 and 3 Soil/Source Control Operable Unit (OU2), Proposed Plan*; Final; Prepared for HAZWRAP; Portland, Maine; September 1993, Revised April 1994.
- ABB-ES, 1994c. *OU 2 Record of Decision*; Final; Installation Restoration Program; Prepared for HAZWRAP; Portland, Maine; November.
- ABB-ES, 1995. *OU 4 Remedial Investigation Report*; Final; Installation Restoration Program; Loring Air Force Base; Prepared for HAZWRAP; Portland, Maine; November.
- ABB-ES, 1996a. *Proposed Plan, No Further CERCLA Action and Minimal Action for Operable Unit 4*; Installation Restoration Program; Loring Air Force Base; Prepared for HAZWRAP; Portland, Maine; May.
- ABB-ES, 1996b. *Operable Unit 4 (OU4) Record of Decision*; Final; Prepared for HAZWRAP; Portland, Maine; September 1996.

ABB-ES, 1997. *Post Closure Plan, Operable Unit 2 and 4 (OUs 2 and 4)*; Final; Prepared for HAZWRAP; Portland, Maine; February.

R.F. Weston, Inc., 1998. *Installation Restoration Program, Phase II Confirmatory/Quantification; Loring Air Force Base; Limestone, Maine*; January.



**LEGEND**

□ SITE

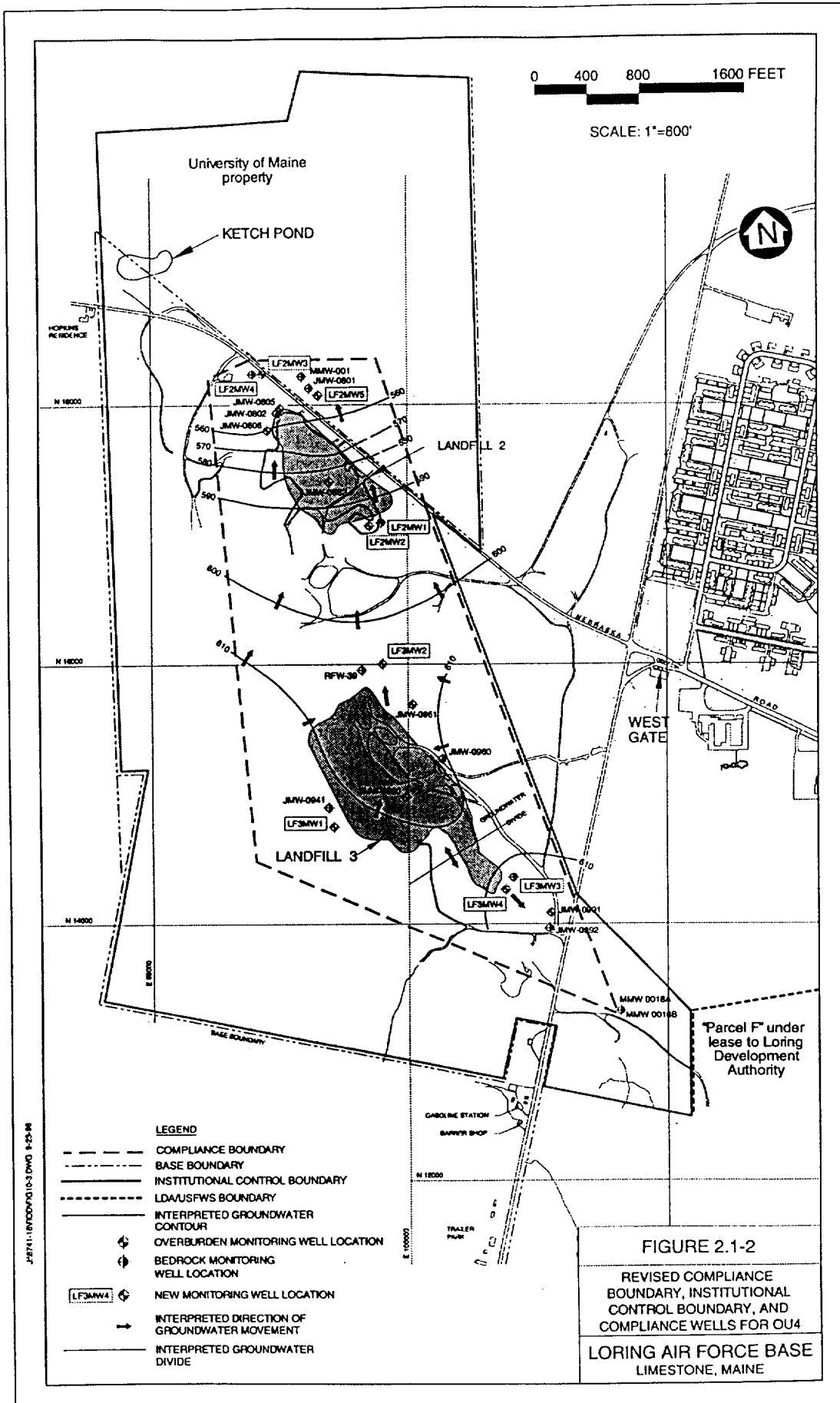
0 500 1000 2000 FEET

SCALE: 1" = 1000'

**FIGURE 2.1-1**

**LOCATION OF  
OU 4 SITES**

**LORING AIR FORCE BASE**



## **SECTION 2.2**

### **OPERABLE UNIT 3**

### **CONTRACT STORAGE SHED AREA**

#### **2.2.1 SCOPE AND NATURE OF FIVE-YEAR REVIEW**

The USAF, in coordination with USEPA Region I, and the MEDEP, conducted this review of the Contract Storage Shed Area (CSSA) site remedy pursuant to CERCLA section 121(c), NCP section 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23, 1991) and 93557-02A (Jun 26, 1994). It is a statutory review. The purpose of the review is to ensure that a remedial action remains protective of public health and the environment. This document has been prepared within the scope of a level I review which is applicable for this site.

#### **2.2.2 Summary of Site Conditions**

##### **2.2.2.1 Site Location and Description**

The CSSA site has been managed as a “source control” site for the purposes of remediating soil media for the protection of human health and the environment and elimination of sources of groundwater contamination. The CSSA site is located in the south-central portion of LAFB, west of the airfield, south of the supply buildings in the northeast quadrant of the Weinman Road and Kansas Road intersection, and west of the railroad tracks. A demolished storage shed (Building 7258) at the site was open on the east side facing the railroad tracks and flightline. The site is primarily covered with grass, except for a gravel area west of the former building location (see Figure 2.2-1).

The closest residential population is located south of the East Gate of LAFB, approximately 2,100 feet from the site. Because of the industrial nature of the site, few ecological receptors have been observed in the vicinity. A drainage culvert is located on the northeastern side of the site, next to the railroad tracks, but has only intermittent flow following rain events or winter thaw. Groundwater is not used as a drinking water or industrial process water within the confines of LAFB.

##### **2.2.2.2 Site History**

The CSSA site historically served as an industrial waste handling area. The storage shed has since been removed. Prior to demolition of Building 7258, this site was used for storage and staging of electrical transformers, waste oil, and waste chemical drums. The materials stored in this shed were similar to those currently stored in the Chemical Storage Building 7230.

The CSSA site is currently unoccupied space. The future use of the site is expected to remain industrial and has been classified as airport-support property by the Loring Redevelopment Authority.

The suspected sources of contaminants at the CSSA site are spills which occurred during the handling of electrical transformers, waste oil, and waste chemical drums. Accidental releases in this area were witnessed by base personnel. Drums with location identifications which included Drum Storage, Stockroom 03B, and Buildings 7258, contributed to some of the spills. Pesticide mixing at the site was verbally reported, but has not been confirmed by written documentation. These accidental releases impacted surface and subsurface soils, sediments, and groundwater.

## **2.2.3 Summary of Response Action Selected**

### **2.2.3.1 Remedial Action Objectives**

RAOs are developed to serve as a framework for the identification of remedial action alternatives. According to the Federal and State guidance, RAOs should be designed to protect human health and the environment by identifying COCs, receptor groups of greatest concern, exposure routes associated with the highest risk estimates, and a target risk level of the individual contaminants based on site-specific exposure scenarios (i.e., Remediation Goals [RGs]).

The RAOs for the CSSA site for the protection of human health include:

- Reduce soil and sediment levels of systemic toxicants to equal background or a target hazard index of one (1) for individual constituents, with the cumulative target hazard index not to exceed 10 for the most exposed human receptor groups.
- Reduce soil and sediment levels of potential carcinogens to equal background or a target risk of  $1 \times 10^{-6}$  for individual constituents, with a cumulative risk of no greater than  $1 \times 10^{-5}$  for the total excess carcinogenic risk for the most exposed human receptor groups. The method detection limit is used as a goal when background and risk-based goals are below analytical limits.
- Reduce subsurface soil levels to levels that would be protective of groundwater quality.
- Control the migration of soil and sediment contamination to uncontaminated areas.

### **2.2.3.2 Selected Remedial Action**

The selected remedial alternative for the CSSA site involves the excavation, removal and land disposal of soils contaminated with PAHs, pesticides (except chlordane) and heavy metals at concentrations that exceed the RGs (Table 2.2-1). Chlordane-contaminated soils are to remain on site and be covered by a minimum of 2 feet of clean soil, with erosion protection, to prevent future exposure. Institutional controls to identify the presence of chlordane at this site and to manage exposure to chlordane have been established and will be modified as necessary (e.g., placed in a deed rather than a lease) to ensure that they remain in

place and effective. Figure 2.2-2 shows locations, area, and the depth of the contaminated soils at the CSSA site.

### **2.2.3.3 Standards Assessment**

The cleanup levels at the CSSA site were established to reduce hazard indices and carcinogenic risk to benchmark values as well as to protect groundwater. None of the conditions evaluated in the RAs for this site have changed. Chemical, Location, and Action Specific ARARs were complied with during the remedial action.

## **2.2.4 SUMMARY OF RESPONSE ACTION(S) TAKEN**

### **2.2.4.1 Description of Actions**

The primary remedial action was to excavate contaminated soils and transport the soils to LF-3, located on LAFB, for disposal. (See Figure 2.2-3 and Table 2.2-2) Closure of LF-3 included capping which will prevent contaminant migration from surface water run off and run on. Locations designated as chlordane-contaminated sites were excavated to a depth of two feet below ground surface (bgs). These soils were then placed in adjacent excavations and covered with at least two feet of clean fill. The excavations where chlordane soils were removed were backfilled with two feet of clean fill.

Approximately 2,500 cubic yards (cy) of contaminated soil were excavated, loaded into dump trucks and transported to LF-3 for disposal. 180 cy of chlordane soils were excavated and placed into adjacent excavations.

The chlordane soils, location I and location J, (see Figure 2.2-3) were excavated after adjacent excavations had confirmation data showing contamination levels below RGs. The chlordane soils removed from location I and location J were moved and placed into location F and L.

The ROD required two feet of soil cover over the chlordane soils. To accomplish this, the chlordane-contaminated soils were removed and placed into excavated areas I and J which afforded a minimum cover of two feet over the compacted chlordane-contaminated soils. The final grade over these areas matched the existing grades. Otherwise, the chlordane locations would have had a mound of two feet above existing grade. These mounds would be subject to future grading and erosion.

Confirmatory sampling was completed on all locations. Some re-excavation and re-sampling was performed until all test results showed compliance with the performance requirements.

The RGs stipulated in the ROD have been met. The current long term lease with the Loring Development Authority provides controls which assure inappropriate use of the CSSA site does not occur. Future owners of the property will need to be put on notice that residual

chlordane exists on the site and appropriate use restrictions implemented through property transfer documents (e.g., deed) will be placed on the site to manage potential future exposure.

#### **2.2.4.2 Areas of Non-Compliance**

The RGs for the CSSA site have been met. There are no known areas of non-compliance.

#### **2.2.4.3 Residual Risk**

Chlordane contaminated soil was excavated and placed on the site where it has more than two feet of cover and no risk of erosion. While the chlordane identified in the Remedial Investigation did not present a future human health risk, its concentrations were above the risk based screening values developed at Loring. Therefore, the Contract Storage Shed site does not meet the requirement for unrestricted use and unlimited exposure.

### **2.2.5 RESULTS AND RECOMMENDATIONS**

#### **2.2.5.1 Results**

The remedy selected for the CSSA site under OU-3 (source control) remains protective of human health and the environment.

#### **2.2.5.2 Recommendations**

- AFBCA assure transfer documents include restrictions which implement the OU3 remedy and are consistent with the Record of Decision for the Disposal of Loring AFB, Maine, April 1994 and notify future landowners of potential chlordane presence.

#### **2.2.5.3 Statement of Protectiveness**

The remedy selected for the CSSA site under OU-3 (source control) remains protective of human health and the environment.

#### **2.2.5.4 Five Year Reviews**

The next five-year review for the CSSA site will be conducted in 2005.

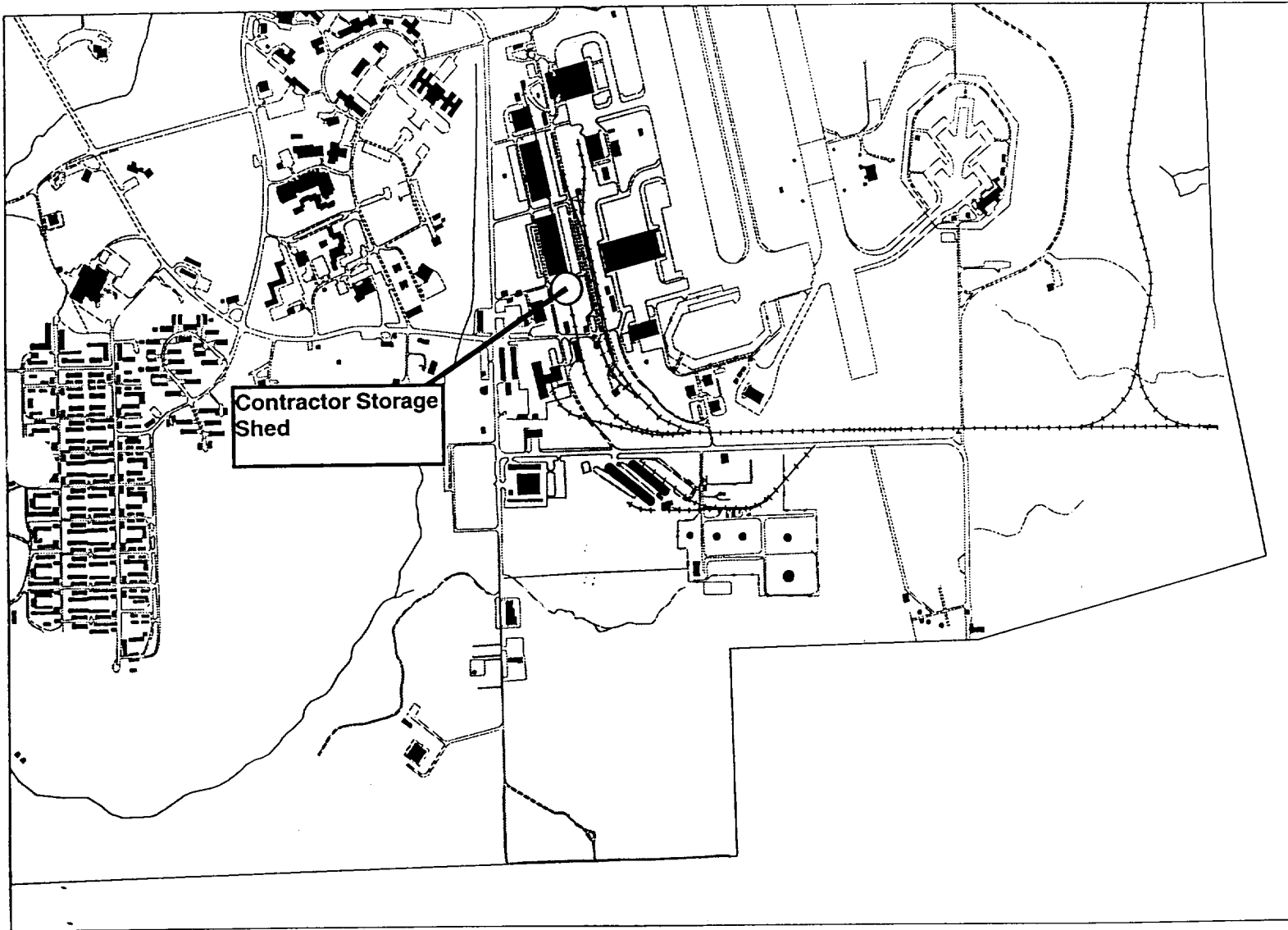
### **2.2.6 REFERENCES**

BEI, 1997. *Remedial Action Report for the Contract Storage Shed Area*, September.

LAW, 1996 a. *Debris Disposal Areas Operable Unit 3 (OU3) RI/ASI Technical Report*,  
March.

LAW, 1996 b. *Operable Unit 3 (OU3) Debris Disposal Areas Record of Decision*,  
September.

Figure 2.2-1



Location Map  
Contractor Storage Shed

## LEGEND

- SB—Soil Boring Location
  - ⊙ MW—Monitoring Well Location (Overburden)
  - ⊕ MW—Monitoring Well Location (Bedrock)
  - ▲ SS—Surface Soil Sample Location
  - ⊙ RV—Sediment Sample Location
  - Paved Roads
  - Fence Line
  - Tree Line
  - Railroads
  - Foundation Remains Of Former Building
  - - - Outline Of Former Building
  - ▨ Former Building 7258
  - (A) Excavation Area ID
  - Clean Soil Cover Over Chlordane-Contaminated Area
- 
- |   |          |
|---|----------|
| ▨ | 1.5 FEET |
| ▨ | 3 FEET   |
| ▨ | 5 FEET   |
| ▨ | 7 FEET   |
- EXCAVATION DEPTHS FOR SOILS TO BE DISPOSED OF IN LANDFILL No. 3.
- 0 80 160  
SCALE IN FEET

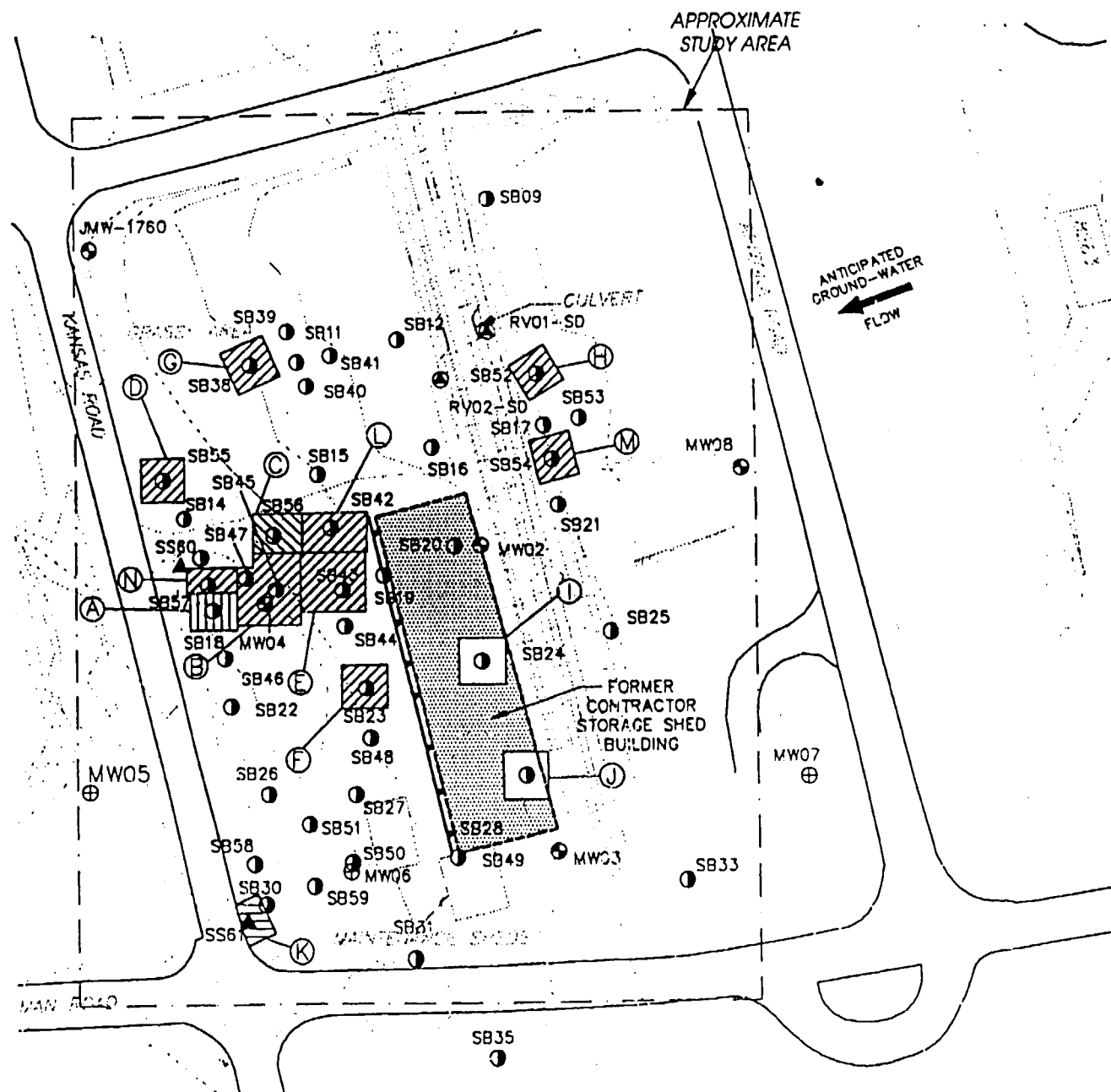


Figure 2.2-2  
OU3-Contractor Storage Shed, Selected Remedial Action  
Loring Air Force Base

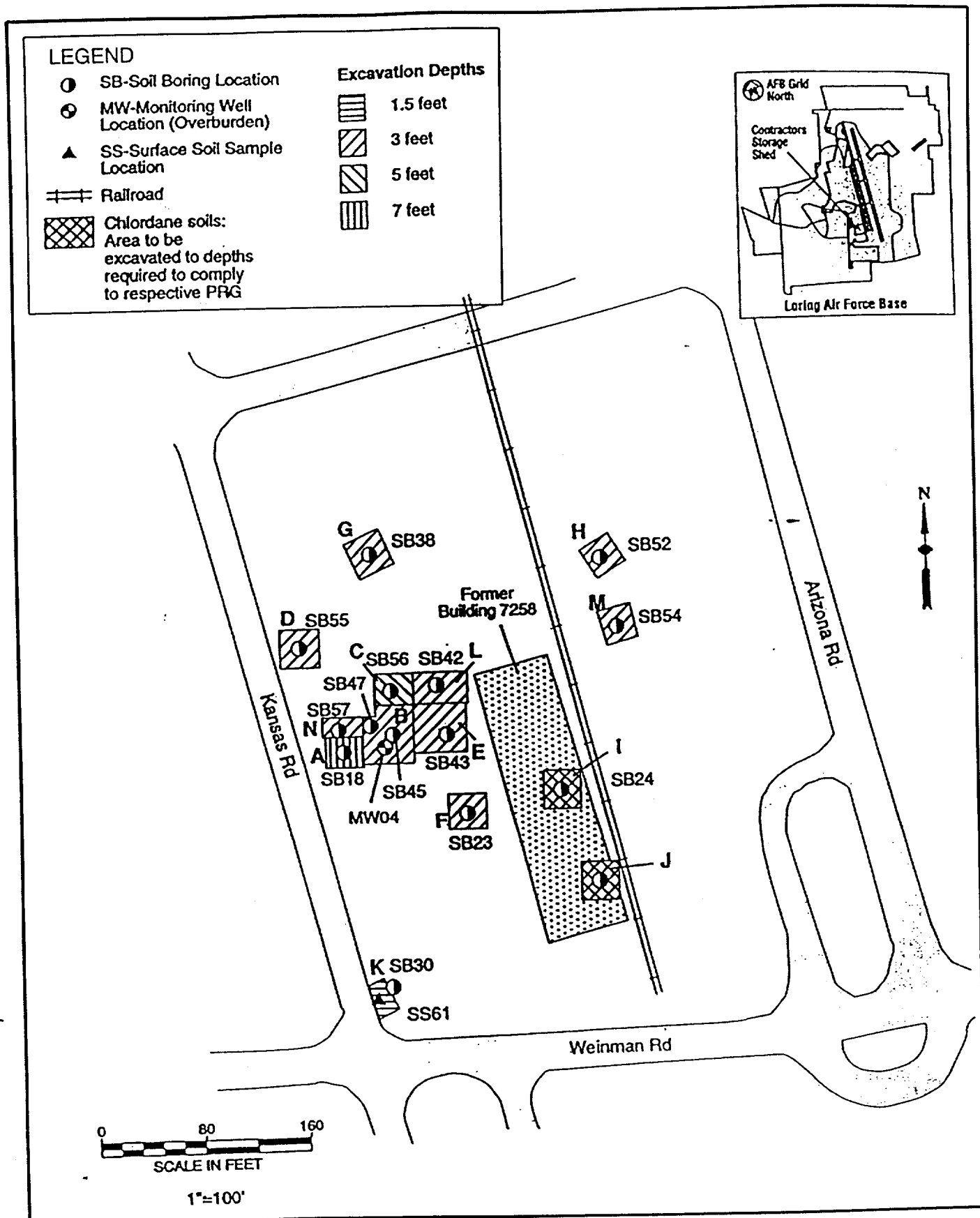


Figure 2.2-3  
OU3-Contractor Storage Shed  
Remedial Action Taken  
Loring Air Force Base

Table 2.2-1

SOIL REMEDIATION GOALS  
Record of Decision  
Contractor Storage Shed Area, OU3  
Loring Air Force Base, Maine

Long Air Force Base, Maine					
Constituent	Remediation Goals (1E+06/1E+05) (mg/kg)	Surface Soil Basis for Selection	Soil to Ground Water Pathway Levels DAF:10 (e) (mg/kg)	Observed Range for Site Soils	
				Min (mg/kg)	Max (mg/kg)
<b><u>TOTAL METALS:</u></b>					
Barium	100/1,000	Risk: Construction Worker-Inhalation	32	4.7	220
Cadmium	16/160	Risk: Construction Worker-Inhalation	6	0.04	27
Lead #	880/8,800	Risk: Construction Worker-Ingestion+Dermal	NA	9.7	110
Manganese	1400	Background	NA	250	2900
<b><u>SEMI-VOLATILES:</u></b>					
Benzo(a)anthracene	0.470 (a)	Background	3.6	0.01 JQ	88 J
Benzo(a)pyrene	0.400 (a)	Background	37	0.0061 JQ	76 J
Benzo(b)fluoranthene	1.100 (a)	Background	8.9	0.034 JQ	96 J
Benzo(k)fluoranthene	0.400 (b)	Method Detection Limit	440	0.12 JQ	32 J
Chrysene	3/30	Risk: Commercial Worker-Ingestion+Dermal	310	0.033 JQ	67 J
Dibenz(a,h)anthracene	0.400 (b)	Method Detection Limit	1.8	0.022 JQ	12J
Ideno(1,2,3-cd)pyrene	0.400 (b)	Method Detection Limit	44	0.018 JQ	36 J
Pyrene	71/710	Risk: Construction Worker-Ingestion+Dermal	1,400	0.01 JQ	120 J
<b><u>PESTICIDES/PCBs:</u></b>					
Chlordane	0.07/0.7	Risk: Commercial Worker-Ingestion+Dermal	2.1	0.16	6.2
4,4'-DDD	0.5/4	Anthropogenic Background/Risk at 1E + 05	1.7	0.0007	7.6
4,4'-DDE	0.3/3	Risk: Commercial Worker/ Ingestion + Dermal	1.7	0.00098	23
4,4'-DDT	0.9/3	Anthropogenic Background/Risk at 1E + 05	4.7	0.00062	100
Aroclor-1260	1 (c)	USEPA Guidance	26	0.035	0.42
TPH: (n-Hexane)	870/8,700 (d)	Risk: Construction Worker - Ingestion + Dermal	NA	18	24,000 J

All concentrations are in mg/kg.

Background concentrations are from Consensus Statement (LAFB, 1995).

Risk-based concentrations were back-calculated using exposure parameters listed in Appendix J of the RI/ASI Report.

Target Risks are 1E + 06/1E + 05 for carcinogens with 1E + 05 as cumulative risk boundary per sample point.

Target Hazard Indices are one/ten for noncarcinogens with ten as cumulative risk boundary per sample point.

# Lead PRGs based on estimated oral Rfd of 7.5E-03 which was backcalculated from acceptable concentration of 400 mg/kg in residential setting.

(a) Background concentration is recommended as alternative cleanup goal for carcinogenic PAHs (Sample JSS-0584, Loring AFB, February 1995).

(b) Method Detection Limit listed as remediation goal because risk-based and background goals are below detection limits.

(c) Based on Guidance on remedial Actions for superfund Sites with PCB Contamination, EPA/540G-90/007.

(d) Taken from ABB, 1994 in order to be consistent with remediation at other OU Sites.

(e) Dilution and Attenuation Factor from Soil Screening Guidance, EPA/540/R - 94/101, December 1994. These are remediation goals for subsurface soils which are not excavated. Simple site-specific levels were calculated using the Technical Background Document for Soil Screening Guidance (1994) with a target risk of 1 for noncarcinogens and 1 x 10<sup>-5</sup> for carcinogens.

NA - Not available

JQ - Estimated concentration below quantitation limit

J - Estimated concentration

TABLE 2.2-2

**Locations, Contaminants of Concern and Estimated Numbers of Confirmation Samples  
for the Contractor Storage Shed Area (CSSA)  
Loring AFB, ME**

Location	Approximate Surficial Area in Square Ft	Maximum Grid Interval	Primary Contaminants of Concern	Estimated Number of Confirmation Samples
A, B, C, E, L and N <sup>1</sup>	6,355	x axis in ft 25.8 y axis in ft 22.3	Fuel oil cPAHs <sup>2</sup> Pesticides	16
D	900		cPAHs <sup>2</sup> Pesticides	5
F	900		Pesticides	5
G	900		cPAHs <sup>2</sup>	5
H	900		Cadmium PCBs	5
I	825		Chlordane	5 <sup>4</sup>
J	825		Chlordane	5 <sup>4</sup>
K	540		Pesticides	5
M	900		cPAHs <sup>2</sup>	5
<b>TOTAL</b>				56

1 Locations A, B, C, E, L and N are contiguous and are therefore considered as one unit.

2 Carcinogenic PAHs

3 One sample to be taken from the center of the excavation, and one from the center of each of the four side walls.

4 Per 5 ft depth of excavation.

Source: Remedial Action Report - Contractor Storage Shed Area, Loring Air Force Base, Limestone, ME.